

## Difference between instrumental and personal observations.—Cont'd.

Stations.	Latitude.	Apparatus.	Total possible duration for the whole month.	Personal estimated area of clear sky.	Instrumental record of sunshine.			
					Photographic.	Difference.	Thermometric.	Difference.
Atlantic City, N. J.	39 22	P.	371.4	41	50	+9	51	+15
Denver, Colo.	39 45	P.	371.2	43	64	+21	51	+15
Indianapolis, Ind.	39 46	T.	371.2	36	41	.....	59	+18
Philadelphia, Pa.	39 57	T.	371.2	41	.....	.....	38	+3
Columbus, Ohio	39 58	T.	371.2	30	.....	.....	.....	.....
Pittsburg, Pa.	40 33	T.	371.2	34	.....	.....	53	+11
New York, N. Y.	40 43	T.	371.2	42	.....	.....	.....	.....
Salt Lake City, Utah	40 46	P.	371.2	20	46	+26	.....	.....
Eureka, Cal.	40 48	P.	371.2	35	43	+7	.....	.....
Cheyenne, Wyo.	41 08	P.	371.2	49	58	+9	.....	.....
Omaha, Nebr.	41 16	P.	371.2	32	43	+10	.....	.....
Cleveland, Ohio	41 30	T.	370.8	42	.....	.....	46	+4
Des Moines, Iowa	41 35	T.	370.8	37	.....	.....	40	+3
Chicago, Ill.	41 53	T.	370.8	46	.....	.....	50	+4
Erie, Pa.	42 07	T.	370.8	34	.....	.....	51	+17
Binghamton, N. Y.	42 08	T.	370.8	37	.....	.....	38	+1
Detroit, Mich.	42 20	T.	370.8	39	.....	.....	50	+11
Boston, Mass.	42 21	T.	370.8	39	.....	.....	44	+5
Dubuque, Iowa	42 30	T.	370.8	42	.....	.....	41	-1
Albany, N. Y.	42 39	T.	370.9	40	.....	.....	59	+19
Buffalo, N. Y.	42 53	T.	370.9	39	.....	.....	.....	.....
Rochester, N. Y.	43 06	T.	370.9	42	.....	.....	44	+2
Idaho Falls, Idaho	43 29	T.	370.9	40	.....	.....	41	+1
Portland, Me.	43 39	T.	370.7	43	.....	.....	58	+15
Northfield, Vt.	44 10	P.	370.7	32	43	+11	.....	.....
Eastport, Me.	44 54	P.	370.7	35	43	+7	.....	.....
St. Paul, Minn.	44 58	P.	370.7	37	38	+1	.....	.....
Minneapolis, Minn.	44 59	T.	370.7	.....	.....	.....	39	.....
Portland, Oreg.	45 32	T.	370.3	31	.....	.....	27	-4
Helena, Mont.	45 32	P.	370.3	31	24	.....	.....	-7
Bismarck, N. Dak.	46 34	P.	370.3	43	48	+5	.....	.....
Seattle, Wash.	46 47	P.	370.3	54	60	+6	.....	.....
Spokane, Wash.	47 38	T.	370.1	36	.....	.....	46	+10
	47 40	P.	370.1	34	.....	.....	.....	.....

\* Record incomplete.

## ATMOSPHERIC ELECTRICITY.

Numerical statistics relative to auroras and thunderstorms are given in Table IX, which shows the number of stations from which meteorological reports were received, and the

number of such stations reporting thunderstorms (T) and auroras (A) in each State and on each day of the month, respectively.

**Thunderstorms.**—The dates on which reports of thunderstorms for the whole country were most numerous were: 8th, 213; 9th, 152; 19th, 148; 21st, 189; 31st, 166.

Thunderstorm reports were most numerous in: Illinois, 174; Missouri, 250; Ohio, 165; Tennessee, 156.

Thunderstorms were most frequent in: Arkansas, Louisiana, South Carolina, 22 days; Mississippi, 25; Missouri, 23; Tennessee, 20.

**Auroras.**—The evenings on which bright moonlight must have interfered with observations of faint auroras are assumed to be the four preceding and following the date of full moon, viz, from the 14th to the 22d, inclusive. On the remaining twenty-two days of this month 157 reports were received, or an average of about 7 per day. The dates on which the number of reports for the whole country especially exceeded this average were: 3d, 24; 4th, 37; 22d, 31; 28th, 20.

Auroras were reported most frequently in: Maine, 17; Michigan and New Jersey, 16; North Dakota, 48; Wisconsin, 19.

The number of reports was a large percentage of the number of observers in: Maine, 131; North Dakota, 123; New Hampshire, 69; Wisconsin, 33.

## CANADIAN REPORTS.

Thunderstorms were reported as follows: Grand Manan, 24th; Ottawa, 20th; Port Stanley, 8th, 20th; Winnipeg, 29th; Esquimalt, 27th.

Auroras were reported as follows: St. Andrews, 4th; Father Point, 4th, 7th, 8th, 23d, 27th, 28th, 29th; Quebec, 4th, 8th, 29th; Montreal, 4th, 28th; Toronto, 22d; White River, 3d, 12th, 24th, 26th, 27th; Port Stanley, 22d; Port Arthur, 22d; Winnipeg, 1st, 3d, 10th, 12th, 21st to 26th, 28th, 29th; Minnedosa, 1st, 2d, 4th, 5th, 6th, 10th, 22d; Medicine Hat, 8th, 22d, 29th; Prince Albert, 5th, 22d, 27th, 28th; Battleford, 4th, 10th, 22d, 23d; Kamloops, 8th; Banff, 21st, 30th, 31st.

## CLIMATE AND CROP SERVICE.

By JAMES BERRY, Chief of Climate and Crop Service Division

The following extracts relating to the general weather conditions in the several States and Territories are taken from the monthly reports of the respective sections of the Climate and Crop Service. The name of the section director is given after each summary.

Snowfall and rainfall are expressed in inches.

**Alabama.**—The mean temperature was 60.0°, or 5.9° above normal; the highest was 89°, at Elba on the 13th, and the lowest, 22°, at Goodwater on the 1st. The average precipitation was 9.59, or 3.83 above normal; the greatest monthly amount, 20.83, occurred at Newburg, and the least, 4.29, at Livingston.—*F. P. Chaffee.*

**Arizona.**—The mean temperature was 50.3°, or 3.3° below normal; the highest was 94°, at Buckeye on the 19th, and the lowest, 10°, at Flagstaff on the 23d. The average precipitation was 0.66, or 0.43 below normal; the greatest monthly amount, 3.09, occurred at Pinal Ranch, while none fell at San Simon, and only traces at Potano and Tuba.—*W. T. Blythe.*

**Arkansas.**—The mean temperature was 56.0°, or 5.3° above normal; the highest was 88°, at Texarkana on the 21st and at Elon on the 30th, and the lowest, 13°, at Silver Springs on the 14th. The average precipitation was 9.72, or 4.91 above normal; the greatest monthly amount, 17.04, occurred at Moore, and the least, 4.93, at Texarkana.—*G. G. Harkness.*

**California.**—The mean temperature was 48.0°, or 5.0° below normal; the highest was 98°, at Volcano Springs on the 25th, and the lowest, 14° below zero, at Bodie on the 8th. The average precipitation was 3.98, or 0.55 above normal; the greatest monthly amount, 19.12, occurred

at Bear Valley, while none fell at Needles, Ogilby, Palm Springs, Salton, and Volcano Springs.—*J. A. Barwick.*

**Colorado.**—The mean temperature was 30.9°, or 1.7 below normal; the highest was 78°, at Lamar on the 28th, and the lowest, 21° below zero, at Breckenridge on the 22d. The average precipitation was 2.37, or 1.14 above normal; the greatest monthly amount, 21.00, occurred at Ruby, and the least, 0.15, at Holly.—*F. H. Brandenburg.*

**Florida.**—The mean temperature was 70.6°, or nearly 4.0° above normal; the highest was 94°, at Archer on the 15th, and the lowest, 33°, at Fort Meade on the 26th. The average precipitation was 2.06, or 0.94 below normal; the greatest monthly amount, 8.64, occurred at Tallahassee, while none fell at Oxford.—*A. J. Mitchell.*

**Georgia.**—The average temperature was 59.2°, or 4.6° above normal; the highest was 90°, at Millen on the 22d, and the lowest, 23°, at Covington on the 27th, and at Diamond on the 28th. The average precipitation was 8.26, or 3.02 above normal; the greatest monthly amount, 13.31, occurred at Morgan, and the least, 4.12, at Quitman. At Fort Gaines 9.51 fell in twenty-four hours on the 23d.—*J. B. Marbury.*

**Idaho.**—The mean temperature was 27.8°; the highest was 67°, at Oakley on the 25th, and the lowest, 30° below zero, at Maryville on the 13th. The average precipitation was 2.51; the greatest monthly amount, 6.49, occurred at Idaho City, and the least, 0.10, at Blackfoot and Oakley. The month was stormy and unusually cold.—*D. P. McCallum.*

**Illinois.**—The mean temperature was 1.8° above normal; the highest was 79°, at Golconda on the 21st, and the lowest, 2° below zero, at Chenuing on the 4th. The average precipitation was 5.96, or 3.18 above normal; the greatest monthly amount, 12.63, occurred at Cobden, and the least, 2.63, at Monmouth.—*O. E. Linney.*

**Indiana.**—The mean temperature was 42.5°, or 4.3° above normal;

the highest was 82°, at Washington on the 21st, and the lowest, 9°, at Greencastle on the 2d. The average precipitation was 6.66, or 3.27 above normal; the greatest monthly amount, 13.22, occurred at Vincennes, and the least, 2.42, at Auburn.—*C. F. R. Wapenhans.*

*Iowa.*—The mean temperature was 32.0°, or 0.5° above normal; the highest was 72°, at Bonaparte on the 19th, and the lowest, 22° below zero, at Rock Rapids on the 14th. The average precipitation was 2.39, or 0.36 above normal; the greatest monthly amount, 6.16, occurred at Stuart, and the least, 0.39, at Ames.—*G. M. Chappel.*

*Kansas.*—The mean temperature was 42.5°, or 1.3° above normal; the highest was 90°, at Meade on the 26th, and the lowest, 5° below zero, at Achilles on the 13th and at Seneca on the 14th. The average precipitation was 1.97, or 0.49 above normal; the greatest monthly amount, 5.47, occurred at Fort Scott, and the least, trace, at Meade.—*T. B. Jennings.*

*Kentucky.*—The mean temperature was 49.6°, or 5.0° above normal; the highest was 86°, at Greensburg on the 21st, and the lowest, 20°, at Eubank on the 28th, and at Mount Sterling on the 27th. The average precipitation was 7.94, or 3.64 above normal; the greatest monthly amount, 12.57, occurred at Earlington, and the least, 4.04, at Sandyhook.—*Frank Burke.*

*Louisiana.*—The mean temperature was 66.2°, or 6.8° above normal; the highest was 92°, at Donaldsonville on the 20th, and the lowest, 29°, at Liberty Hill on the 24th. The month was the warmest March on record. The average precipitation was 5.43, or 0.65 above normal; the greatest monthly amount, 7.81, occurred at Farmerville, and the least, 1.48, at Houma.—*R. E. Kerkam.*

*Maryland.*—The mean temperature was 44.4°, or 3.8° above normal; the highest was 82°, at Washington, D. C., on the 22d, and the lowest, 12°, at Deer Park, on the 1st. The average precipitation was 2.93, or 0.65 below normal; the greatest monthly amount, 5.05, occurred at Cherryfields, and the least, 2.04, at Milford.—*G. E. Hunt.*

*Michigan.*—The mean temperature was 29.4°, or 1.0° above normal; the highest was 70°, at Mottville on the 30th, and the lowest, 35° below zero, at Humboldt on the 2d. The average precipitation was 2.99, or 1.60 above normal; the greatest monthly amount, 4.69, occurred at Grand Rapids, and the least, 0.60, at Manistee.—*C. F. Schneider.*

*Minnesota.*—The average temperature was 20.7°, or 3.5° below normal; the highest was 68°, at Wabasha on the 30th, and the lowest, 49° below zero, at Pokegama on the 15th. The average precipitation was 2.07, or 0.62 above normal; the greatest monthly amount, 4.81, occurred at Lutsen, and the least, 0.33, at Ada.—*T. S. Outram.*

*Mississippi.*—The mean temperature was 62.7, or 6.0 above normal; the highest was 91°, at Yazoo City on the 31st, and the lowest, 24°, at Waynesboro on the 1st. The average precipitation was 8.24, or 2.09 above normal; the greatest monthly amount, 19.12, occurred at Fulton.—*R. J. Hyatt.*

*Missouri.*—The mean temperature was 44.0°, or 2.9° above normal; the highest was 93°, at Neosho on the 31st, and the lowest, 5° below zero, at Pickering on the 14th. The average precipitation was 6.20, or 3.58 above normal; the greatest monthly amount, 15.23, occurred at Gordonville, and the least, 1.51, at Maryville.—*A. E. Hackett.*

*Montana.*—The mean temperature was 21.0°, or 7.0° below normal; the highest was 70°, at St. Ignatius Mission on the 1st, and at Fort Benton on the 25th, and the lowest, 41° below zero, at Havre on the 13th. The month was the coldest March on record. The average precipitation was 0.13 above normal; the greatest monthly amount, 3.50, occurred at Miles City, and the least, trace, at Manhattan.—*R. M. Crawford.*

*Nebraska.*—The mean temperature was 34.2°, or 0.1° below normal; the highest was 82°, at McCook on the 18th, and the lowest, 14° below zero, at Fort Robinson and Norfolk on the 13th. The average precipitation was 1.49, or 0.31 above normal; the greatest monthly amount, 4.25, occurred at Milford, and the least, 0.26, at Dunning.—*G. A. Loveland.*

*Nevada.*—The mean temperature was 30.9°, or 7.6° below normal; the highest was 79°, at Candelaria on the 25th, and the lowest, 19° below zero, at Hamilton on the 22d. The average precipitation was 1.39, or 0.20 above normal; the greatest monthly amount, 4.34, occurred at Lewers Ranch, and the least, trace, at Hot Springs.—*R. F. Young.*

*New England.*—The mean temperature was 32.4°, or 1.8° above normal; the highest was 66°, at Colchester, Conn., on the 23d, and the lowest, 28° below zero, at Fairfield, Me., and at Lancaster, N. H., on the 1st. The average precipitation was 3.63, or 0.53 below normal; the greatest monthly amount, 5.80, occurred at Jacksonville, Vt., and the least, 2.01, at Cornwall, Vt.—*J. W. Smith.*

*New Jersey.*—The mean temperature was 40.0°, or 2.8° above normal; the highest was 77°, at Vineland on the 22d, and the lowest, 8°, at Charlotteburg on the 1st. The average precipitation was 2.78, or 1.19 below normal; the greatest monthly amount, 4.32, occurred at Chester, and the least, 1.55, at Egg Island.—*E. G. McGann.*

*New Mexico.*—The mean temperature was considerably below normal; the highest was 83°, at Eddy on the 27th, and the lowest, 11° below zero, at Chama and Goldhill on the 22d, and at Buckmans on the 23d. The average precipitation was above normal; the greatest monthly amount, 5.53, occurred at Chama, while none fell at Clayton and Rincon.—*H. B. Hersey.*

*New York.*—The mean temperature was 33.3°, or 3.2° above normal;

the highest was 70°, at South Canisteo on the 22d, and the lowest, 25° below zero, at North Lake on the 1st. The average precipitation was 3.02, or 0.31 above normal; the greatest monthly amount, 7.20, occurred at North Lake, and the least, 1.84, at Westfield.—*R. M. Hardinge.*

*North Carolina.*—The mean temperature was 51.9°, or 3.8° above normal; the highest was 85°, at Tarboro and Southern Pines on the 21st, and the lowest, 15°, at Highlands on the 28th. The average precipitation was 5.56, or 1.02 above normal; the greatest monthly amount, 11.98, occurred at Murphy; and the least, 1.23, at Wilmington.—*C. F. von Herrmann.*

*North Dakota.*—The mean temperature was 12.0°, or 8.3° below normal; the highest was 58°, at Dunseith on the 24th, and the lowest, 48° below zero, at McKinney on the 14th. The average precipitation was 1.28, or 0.31 above normal; the greatest monthly amount, 3.37, occurred at Berthold Agency, and the least, 0.03, at Washburn. The month was the coldest March on record.—*B. H. Bronson.*

*Ohio.*—The mean temperature was 41.5°, or 5.2° above normal; the highest was 82°, at Portsmouth on the 23d, and the lowest, 5°, at Colebrook on the 1st. The average precipitation was 5.17, or 2.28 above normal; the greatest monthly amount, 9.91, occurred at Camp Dennison, and the least, 2.40, at St. Ignatius College, Cleveland. Floods and heavy rains greatly damaged crops and property on lowlands.—*H. W. Richardson.*

*Oklahoma.*—The mean temperature was 51.2°; the highest was 90°, at Pond Creek and Prudence on the 27th, and the lowest, 10°, at Ponca City on the 14th. The average precipitation was 4.16; the greatest monthly amount, 8.83, occurred at Kemp, and the least, 0.62, at Beaver.—*J. I. Widmeyer.*

*Oregon.*—The mean temperature was 38.5°, or 5.0° below normal; the highest was 66°, at Dayville on the 25th, and the lowest, 7° below zero, at Fort Klamath on the 21st. The month was the coldest March since 1889. The average precipitation was 6.36, or 1.48 above normal; the greatest monthly amount, 22.77, occurred at Glenora, and the least, 0.30, at P. Ranch.—*B. S. Pague.*

*Pennsylvania.*—The mean temperature was 39.0°, or 4.1° above normal; the highest was 75°, at Coatesville on the 18th, and the lowest, 5° below zero, at Saegerstown on the 1st. The average precipitation was 3.22, or 0.18 below normal; the greatest monthly amount, 5.86, occurred at Somerset, and the least, 1.01, at Cannonsburg.—*T. F. Townsend.*

*South Carolina.*—The mean temperature was 56.4°, or 24° above normal; the highest was 92°, at Gillisonville on the 21st, and the lowest, 21°, at Cheraw on the 1st and at Walhalla on the 27th. The average precipitation was 4.54, or 0.08 above normal; the greatest monthly amount, 7.81, occurred at Gillisonville, and the least, 2.13, at Conway.—*J. W. Bauer.*

*South Dakota.*—The mean temperature was 23.0°, or about 7.0° below normal; the highest was 75°, at Oelrichs on the 27th, and the lowest, 33° below zero, at Ashcroft on the 12th. The average precipitation was 2.17, or 1.07 above normal; the greatest monthly amount, 7.55 occurred at Aberdeen, and the least, 0.44, at Brookings.—*S. W. Glenn.*

*Tennessee.*—The mean temperature was 53.1°, or 6.0° above normal; the highest was 86°, at Charlotte on the 21st, and the lowest, 17°, at Erasmus and Rugby on the 28th. The average precipitation was 11.27, or 6.19 above normal; the greatest monthly amount, 18.14, occurred at St. Joseph, and the least, 6.44, at McKenzie. Unusually high water and serious damage to property, with considerable loss of human life and live stock, resulted from the great amount of rain.—*H. C. Bate.*

*Texas.*—The mean temperature was 4.4° above normal; there was a general excess, except over the extreme western portion and the Panhandle, where it ranged from normal to 1.6° below, with the greatest deficit at El Paso; the excess varied from 0.2° to 7.3°, with the greatest in the vicinity of Huntsville; the highest was 101°, at Fort Ringgold on the 12th and 13th and Camp Eagle Pass on the 31st, and the lowest, 8°, at Tulia on the 14th. The average precipitation was 1.40 above normal; it was not well distributed, for over the western portion and the Panhandle there was a deficiency ranging from 0.03 to 1.12, while over other portions there was a general excess, which ranged from 0.13 to 3.35 over the east-central and southwest portions and the coast district, and from 0.75 to 5.91 over eastern and northern portions, with the greatest excess at Longview; the greatest monthly amount, 10.31, occurred at Longview, and the least, trace, at Valentine. Farming operations were retarded by dry weather, which continued in all sections until the second decade of the month, and along the coast until near the close of the month, but as a whole good progress was made. Heavy rains near the close of the month did some damage to crops.—*I. M. Cline.*

*Utah.*—The mean temperature was 32.0°, or 8.0° below normal; the highest was 79°, at St. George on the 25th, and the lowest, 16° below zero, at Woodruff on the 2d. The average precipitation was 2.22; the greatest monthly amount, 8.00, occurred at Park City, and the least, 0.24, at Giles.—*J. H. Smith.*

*Virginia.*—The mean temperature was 48.2°, or 3.9° above normal; the highest was 91°, at Bon Air on the 11th, and the lowest, 11°, at Quantico on the 1st. The average precipitation was 4.04, or 0.11 below normal; the greatest monthly amount, 9.82, occurred at Big Stone Gap, and the lowest, 1.70, at Stephens City.—*E. A. Evans.*

**Washington.**—The mean temperature was 36.7°, or 3.7° below normal; the highest was 70°, at Elma on the 2d and at Sunnyside on the 25th. The average precipitation was 4.53, or 0.89 above normal; the greatest monthly amount, 12.32, occurred at Lapush, and the least, 0.15, at Ellensburg.—*G. N. Salisbury.*

**West Virginia.**—The mean temperature was 46.1°, or about 5.0° above normal; the highest was 81°, at Huntington on the 20th, and the lowest, 12°, at Beckly on the 1st. The average precipitation was 3.60, or 0.50 above normal; the greatest monthly amount, 6.52, occurred at Elkhorn, and the least, 1.33, at Burlington.—*H. L. Ball.*

**Wisconsin.**—The mean temperature was 26.7°, or 0.6° below normal; the highest was 71°, at Butternut on the 30th, and the lowest, 27° below zero, at Grantsburg on the 18th. The average precipitation was 2.48, or 0.87 above normal; the greatest monthly amount, 4.83, occurred at Milwaukee, and the least, 1.30, at Koepenick.—*W. M. Wilson.*

**Wyoming.**—The mean temperature was 26.0°, or 8.0° below normal; the highest was 74°, at Fort Laramie on the 27th, and the lowest, 29° below zero, at Sheridan on the 13th. The average precipitation was 1.72, or 0.18 above normal; the greatest monthly amount, 4.23, occurred at Laramie, and the least, 0.35, at Wise.—*M. G. Renoe.*

## RIVER AND FLOOD SERVICE.

By PARK MORRILL, Forecast Official, in charge of River and Flood Service.

The month has been signalized by the development of one of the worst floods ever known in the lower Mississippi Valley; at its close the river has just begun to fall from Cairo to Memphis and is still rising from Helena southward. The flood waters came chiefly out of the lower Ohio, only a moderate flood prevailing in the upper Ohio, and the Mississippi above Cairo remaining well below the danger lines of the gauges. Heavy and continued rains in Tennessee, Kentucky, and adjoining States caused unprecedented floods in the Cumberland and Tennessee rivers, which continued from the 10th to nearly the close of the month. These waters were poured into the lower Ohio, which was already well filled by the waters from its upper reaches. At Cairo the month opened with the river 1.1 foot above danger line and there was a steady rise to a stage 10 feet higher on the 25th. At Memphis the river rose to 4.1 feet above danger line on the 19th, when the breaking of the levees checked its rise and it remained nearly stationary to the end of the month. The cessation of rise at Memphis does not indicate the passage of the flood crest, as is shown by the continued rise at Cairo. The rise at Helena continued, in spite of vast overflows, to the end of the month, when the water was 6.9 feet above danger line. At Arkansas City the rise was checked at 9.9 feet above danger line on the 29th. At Vicksburg and New Orleans the rise continued to the close of the month, at which time the stage was 8.4 feet above danger line at Vicksburg and 1.1 foot at New Orleans.

On the 15th the Weather Bureau issued a warning that "the impending flood will prove very destructive in Arkansas and northern Louisiana." Further warning was given on the 19th that "the floods in the lower Mississippi during the next ten days or two weeks will in many places equal or exceed in magnitude and destructiveness those of any previous year, and additional warning is given to the residents of the threatened districts in Arkansas, Louisiana, and western Mississippi to remove from the region of danger." These warnings were supplemented by further bulletins descriptive of the progress of the flood.

The following résumé of river stages and conditions of navigation in the respective streams is compiled from reports by the officials of the Weather Bureau at various river stations and section centers:

**Hudson River.** (Reported by A. F. Sims, Albany, N. Y.)—At the beginning of March an average of 15 inches of snow covered the forest section of the Hudson watershed, while over the plateau region and valley districts only scattered drifts remained. The ice in the Mohawk and other tributaries of the Hudson was from 12 to 14 inches thick. In the upper Hudson, above the State dam, the ice was from 15 to 22 inches thick, while that of the tidewater portion of the river ranged from 15 inches at Troy to 5 inches at Catskill, and open water was to be seen at points here and there from Poughkeepsie south. On the 2d of March the steamer *Norwich* opened navigation between Newburg and New York by bringing a tow into Roundout Creek. During the early days of the month copious rains melted much of the snow on the upper Hudson watershed, so that by the 9th only drifts remained. On the 6th the Mohawk River rose and the ice below the Adams Island Bridge broke up. The ice in the vicinity of Albany became loosened

from the shore in many places and disappeared entirely below the Greenbush Bridge, leaving two-thirds of a mile of open water, and by forming a gorge at Downs Point caused a slight freshet. The ferryboat *Transport* resumed her regular trips between Rhinecliff and Kingston on the same day. A rapid rise in the Hudson was observed on the 8th, which continued from the early morning up to 9 a. m., when the rise was checked. By the 9th the Mohawk River began to fall, but was still 5 feet above the normal, and the Hudson was 2 feet above the normal. The ice from the upper Hudson jammed at points between Troy and Catskill.

On the 11th the Mohawk River was practically clear of ice from Fonda to its mouth; the ice which came down into the Hudson was from 12 to 16 inches thick. On this date the first boat this season made her appearance on the river at Albany. On the 12th the steamer *Evans* of the Castleton Line went down the river and met very little ice between Albany and Castleton. The People's Line steamer *Drew* arrived at her wharf in Albany from New York on the morning of the 16th, the first through boat from New York; the *City of Troy* passed up in the wake of the *Drew* to the head of tidewater navigation. By the 23d there was practically no snow over the watershed of the Hudson; the river stage was 7 feet above the normal. The cold wave of the night of the 25th checked the flow of surface water, and as a result a fall of 1 foot in the river was recorded on the morning of the 26th. At the close of the month a normal volume of water flowed in the Hudson at Albany, and the opening of navigation in 1897 will go into history as one of the most favorable that this section has ever known. It is a pleasure to state that the public confidence in our reports and forecasts was so great that merchants and others having perishable property in the low-lying portions of Albany and vicinity did not make a move to place their goods above the freshet line.

**Susquehanna River and branches.** (Reported by E. R. Demain, Harrisburg, Pa.)—No damaging floods occurred during the month but the stages of water in most streams of the system averaged higher than for several months, and at Harrisburg the average gauge reading was higher than during any month since April, 1896. On the West Branch of the Susquehanna the ice disappeared from Driftwood Creek at Cameron on March 2, and at Farrandville no ice was reported after the 3d. At Sinnamahoning the water was below the zero of the gauge until the 4th, when a stage of 4 feet was reported, and on the 6th the highest stage during the month, 6 feet, occurred. At Renova the river rose 6 feet from the 2d to the 7th, reaching on the latter date the highest stage of the month, 8.5 feet. At Cedar Run, on Pine Creek, the water was below the zero of the gauge all the month, except on the 12th and 13th, and again from the 21st to the 26th, the highest stage reached being 1.7 feet of the 24th.

On the North Branch the ice broke up at Towanda on the 4th and moved out during the night on a rise of about 3 feet, and floating ice was last observed in the river at that point on the 7th. The ice along the shore at Wilkesbarre began to break up on the 1st, and the river was clear on the 3d, but floe ice was reported subsequently and the river was not entirely free from ice until the 10th. Huntingdon and Mifflin, on the Juniata, report good stages of water during the entire month, ranging from 4 to 10 feet. At Harrisburg the maximum gauge reading noted was 11.5 feet on the 26th, the highest point touched since April 4, 1896.

Watermen report the outlook for rafting on the Susquehanna as very encouraging, and it is expected that a large amount of timber will be floated to market this season. It is estimated that at least 200 more rafts will be floated this spring than last season, provided the requisite stages of water are maintained. A large number have already passed down. On the 11th and 12th sixteen rafts passed Harrisburg, containing about 90,000 cubic feet of timber. One of the largest rafts ever seen on the river arrived at Lockhaven, on the West Branch, a few days since. It was 354 feet long and contained about 80,000 feet. Forty-three rafts were reported in the dam at Lockhaven at the close of the month ready to move out on the next flood.

**Rivers of South Atlantic States.** (Reported by E. A. Evans, Richmond, Va.; C. F. von Herrmann, Raleigh, N. C.; L. N. Jesunofsky, Charleston,